CONTROL ID: 2674900
SUBMISSION ROLE: Abstract Submission

AUTHORS

AUTHORS (LAST NAME, FIRST NAME): Delshad, Samaneh[1]; Collins, Michael J.[1]; Read, Scott A.[1]; Vincent, Stephen[1]

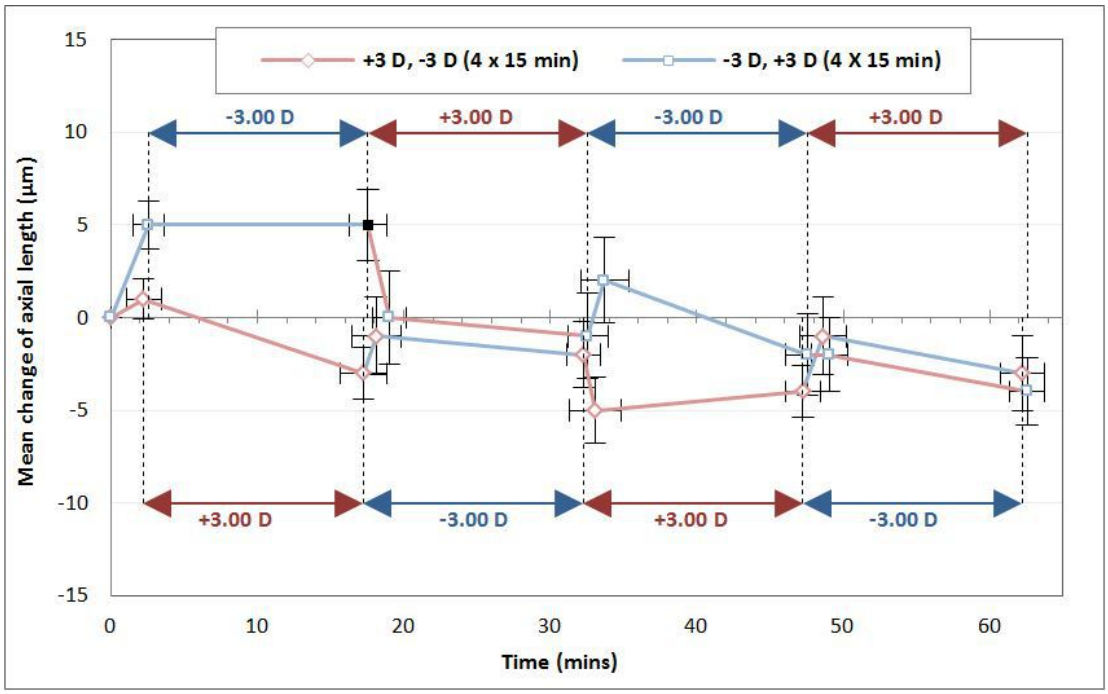
INSTITUTIONS (ALL):
1. Contact Lens & Visual Optics Laboratory, School of Optometry & Vision Science, Queensland University of Technology , Brisbane, QLD, Australia.

Commercial Relationships Disclosure (Abstract): Samaneh Delshad: Commercial Relationship: Code N (No Commercial Relationship) | Michael Collins: Commercial Relationship: Code N (No Commercial Relationship) | Scott Read: Commercial Relationship: Code N (No Commercial Relationship) | Stephen Vincent: Commercial Relationship: Code N (No Commercial Relationship)
Study Group: (none)

ABSTRACT

TITLE: Time course of axial length changes in response to competing episodes of myopic and hyperopic defocus

ABSTRACT BODY:
Purpose: To investigate the short-term changes in human axial length (AxL) in response to continuous and competing episodes of myopic and hyperopic defocus.
Methods: The right eye of 16 young adults was exposed to 60 min episodes of either continuous or competing myopic and hyperopic defocus (+3 D & -3 D), with the left eye optimally corrected to maintain far accommodation. During competing defocus, the eye was exposed to either 30 min or 15 min of alternating cycles of myopic and hyperopic defocus, with the order of lens wear reversed in separate sessions to assess the effects of defocus order. During each 60 min trial, the subjects watched a movie at 6 m in low photopic conditions. The right eye's AxL was measured at baseline and then at 15 min intervals using Lenstar optical biometry. A binocular beam splitter periscope system was used to maintain distance fixation (left eye) and defocus exposure (right eye) during measurements.
Results: AxL underwent a greater magnitude of change during continuous defocus than during competing defocus. The maximum AxL change observed during continuous hyperopic defocus was +7 ± 2 μm of elongation ($p = 0.015$) and during continuous myopic defocus was -8 ± 2 μm of reduction in AxL ($p = 0.07$). When the eye was exposed to 30 min cycles of competing myopic and hyperopic defocus of equal duration, the opposing blur sessions cancelled each other and the eye was at near baseline levels following the final defocus session (final change from baseline, both $p > 0.05$). When the frequency of alternating cycles was 15 min, there was a slight AxL reduction after 60 min of myopic then hyperopic defocus, and hyperopic then myopic defocus, and were -3 ± 2 μm and -4 ± 2 μm, respectively (final change from baseline, both $p > 0.05$) (Figure 1).
Conclusions: In the human eye, the AxL changes within minutes in response to short-term imposed myopic and hyperopic defocus. With competing defocus, at 30 min exposure frequencies, the effects of myopic and hyperopic blur largely cancel each other. At higher frequencies (15 min of alternating exposure), the effect on AxL of myopic defocus appears to be slightly more potent than hyperopic defocus.



Fiqure 1. Plot of mean change in AxL from baseline during 60 min alternating cycles (15 min) of myopic then hyperopic defocus, and hyperopic then myopic defocus in all subjects. Solid symbol indicates significant mean difference from the baseline AxL.

DETAILS

PRESENTATION TYPE: #1 Paper, #2 Poster
CURRENT REVIEWING CODE: 3010 myopia: RPE/choroid/sclera AP
CURRENT SECTION: Anatomy and Pathology/Oncology
Clinical Trial Registration (Abstract): No
Other Registry Site (Abstract): (none)
Registration Number (Abstract): (none)
Date Trial was Registered (MM/DD/YYYY) (Abstract): (none)
Date Trial Began (MM/DD/YYYY) (Abstract): (none)
Grant Support (Abstract): No
Support Detail (Abstract): None

TRAVEL GRANTS and AWARDS APPLICATIONS

AWARDS: ARVO and ARVO Foundation Travel Grants|ARVO / Alcon Early Career Clinician-Scientist Research Award|ARVO Members-in-Training Outstanding Poster Award

AFFIRMATIONS

Affirmations: Affirmation to reveal essential structure, novel compound elements, or identify new gene compounds.
Affirmations: Affirmation of copyright transfer from each author to ARVO, or certification of public domain abstract.
Affirmations: Affirmation of compliance with ARVO policy on registering clinical trials.
Affirmations: Affirmation to pay Annual Meeting's full registration fee.
Affirmations: Affirmation to present same work as abstract submission.
Affirmations: Affirmation that abstract data/conclusions have not been published; not redundant with other submissions from same investigators.
Affirmations: Affirmation of compliance with ARVO's Statement for Use of Animals.
Affirmations: Affirmation of compliance with ARVO's Statement for Use of Human Subjects and/or Declaration of Helsinki.
Affirmations: Affirmation that submission of this abstract has been approved by the Principal Investigator.